



Biology I

Core 40 End-of-Course Assessment
Item Sampler

INDIANA
CORE40

Indiana Department of Education
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Dear Colleague:

In the Core 40 End-of-Course Assessment Item Sampler, you will find information designed to guide, direct and clarify your efforts in preparing for and administering Indiana's Core 40 End-of-Course Assessments (ECAs). We want your students to be as well-prepared as possible when they take the Core 40 ECAs.

As high school teachers, your guidance and knowledge of the Indiana Academic Standards assessed on the Core 40 ECAs, and your familiarity with all aspects of test administration, are critically important to students' success on the tests and with the rest of their coursework. You influence their choices and futures, including their academic achievements.

We expect that the information provided in this sampler will arm you with the necessary material to help educate and motivate your students. Additional information about Core 40 End-of-Course Assessments is available online at www.doe.state.in.us/core40/eca.

Thank you for all you do to prepare students to meet the challenges they will face in this ever-changing and challenging world.

Sincerely,

A handwritten signature in black ink that reads "Dr. Suellen Reed". The signature is written in a cursive, flowing style.

Dr. Suellen Reed
Superintendent of Public Instruction

Introduction

The Indiana Department of Education (IDOE) has developed item samplers to provide students, teachers, administrators, and the public with examples of the types of items that will appear on the End-of-Course Assessments (ECAs). IDOE staff, Indiana teachers, Indiana school administrators, and higher education faculty worked together to write and to edit items. The items went through a process of editing and review to improve, correct, or eliminate poor items.

These item samplers are not practice tests. They represent the types of questions that might appear on future ECAs and can serve as models when teachers are constructing test items for classroom assessment. The samplers include sample test items (questions) and scoring rubrics that reflect Indiana's Academic Standards. All items included in these samplers are samples only and are **not** actual test items. There are three types of test questions: multiple-choice, open-ended, and essay. Some of the open-ended questions require short written answers and other questions require longer written answers. The example of an essay question appears only in the English 11 item sampler.

A test blueprint was developed for each content area prior to test development. The test blueprints are public documents designed to communicate the content of the ECAs. The item samplers provide a breakdown, by approximate percent, of each standard covered. Although this information is included in the item samplers, the items selected and the Standards covered do not represent an entire assessment.

A condensed version of Indiana's Academic Standards is also included in each item sampler. They describe what all Indiana students should know and be able to do upon completing a course. Complete copies of the Standards can be obtained from the Indiana Department of Education or from the Web site <http://www.doe.state.in.us/standards>.

Frequently Asked Questions

What are Core 40 End-of-Course Assessments?

Aligned with Indiana's Academic Standards, End-of-Course Assessments are final exams measuring what students know and are able to do upon completion of targeted Core 40 courses. The Core 40 End-of-Course Assessments are designed to ensure the quality, consistency, and rigor of Core 40 courses across the state.

What are the stakes for schools?

As part of Indiana's School Accountability System under P.L. 221, the End-of-Course Assessments are indicators of school improvement and schools must participate in order to achieve the top two school performance categories ("Exemplary Progress" and "Commendable Progress").

Are students required to pass the End-of-Course Assessments?

This is a local decision. If schools choose to incorporate the ECAs into local grading, it is recommended scores on these assessments should not be used for more than one-third of a student's grade. At this time, there are no "stakes" for students at the state level.

How are special needs and LEP students accommodated on the End-of-Course Assessments?

The accommodations for the End-of-Course Assessments will be based upon those observed for ISTEP+. Generally, that means that a student will receive the same testing accommodations as those that occur throughout the student's education program. Please refer to ISTEP+ 2004-2005 Program Manual Appendix G for more specific information: www.doe.state.in.us/istep/welcome.html.

How will test security for the required End-of-Course Assessments be handled?

Test security for the End-of-Course Assessments will be handled in a manner similar to ISTEP+. Teachers and students will not be given advanced knowledge of the test content prior to administration and testing materials may not be copied or printed. The Corporation Test Coordinator will be responsible for ensuring the security of all test materials and preventing unauthorized circulation of copies of the tests.

How are the items that appear on the End-of-Course Assessments developed?

Committees that consist of Indiana K-12 educators and administrators, higher education faculty, and IDOE staff work, along with the testing vendor, to review, revise, and approve items. A separate committee reviews the passages and items for sensitivity/bias issues.

Science

Biology 1

Biology I Indiana Academic Standards

❑ **Principles of Biology**

Students work with the concepts, principles, and theories that enable them to understand the living environment. They recognize that living organisms are made of cells or cell products that consist of the same components as all other matter, involve the same kinds of transformations of energy, and move using the same kinds of basic forces. Students investigate, through laboratories and fieldwork, how living things function, and how they interact with one another and their environment.

❑ **Historical Perspectives of Biology**

Students gain understanding of how the scientific enterprise operates through examples of historical events. Through the study of these events, they understand that new ideas are limited by the context in which they are conceived, are often rejected by the scientific establishment, sometimes spring from unexpected findings, and grow or transform slowly through the contributions of many different investigators.

NOTE: This page provides an overview of the Indiana Academic Standards. The IDOE Web site at <http://www.doe.state.in.us/standards> contains a complete version of the Indiana Academic Standards, which may be downloaded.

Biology I Indiana Academic Standards

Types of items on the Biology I End-of-Course Assessment:

- **Multiple-choice** – The answer to the question can be found in one of four answer choices provided.
- **Open-ended** – Some questions require either short written answers or longer written answers.

Indiana Core 40 End-of-Course Assessment Biology I Blueprint*

Approximate Weight**	Reporting Category	Standards Covered
19%	Category 1: Molecules and Cells	Standard 1: Principles of Biology
21%	Category 2: Developmental and Organismal Biology	Standard 1: Principles of Biology
20%	Category 3: Genetics	Standard 1: Principles of Biology
20%	Category 4: Evolution and Historical Perspectives	Standard 1: Principles of Biology Standard 2: Historical Perspectives of Biology
20%	Category 5: Ecology	Standard 1: Principles of Biology

*The test blueprint is a public document designed to communicate the content of the Indiana Core 40 ECA.

**The weight assigned to each category is the approximate percent of the total score points that category is assessed on the ECA.

Sample Test Items

Reporting Category 1: Molecules and Cells

1 A severely dehydrated person is often given intravenous saline injections. Saline (0.9% NaCl) has the same electrolyte concentration as human cells. What would happen if pure water was introduced into the body instead of saline?

- ✓ **A** The cells would gain water and swell.
- B** The cells would lose water and shrivel.
- C** The cells would become impermeable to sodium (Na^+) ions.
- D** The cells would become impermeable to chlorine (Cl^-) ions.

2 In which organelle are proteins produced?

- A** nucleus
- B** lysosome
- ✓ **C** ribosome
- D** mitochondria

Reporting Category 2: Developmental and Organismal Biology

3 What is the primary purpose of the receptor proteins located within a cell membrane?

- A** diffusion
- ✓ **B** communication
- C** active transport
- D** energy production

4 Animals that are active at night are MOST likely to have which of the following features?

- A** oval-shaped eyes to reduce friction and pressure
- ✓ **B** a membrane behind the eye to reflect light back to the retina
- C** tear ducts to wet the eyes and eyelids to sweep dirt from the eye
- D** eyes located on the sides of the head to produce a wide field of view

Reporting Category 3: Genetics

5 The curled ears of the American Curl cat are caused by an autosomal dominant allele. What are the chances of a heterozygous female and a homozygous recessive male producing offspring with curled ears?

- A 1 in 4
- ✓ B 2 in 4
- C 3 in 4
- D 4 in 4

Reporting Category 4: Evolution and Historical Perspectives

6 The Giant Anteater of South America, the Giant Armadillo of North America, the Giant Pangolin of Africa, and the Spiny Anteater of Oceania share many characteristics. They all eat ants, have long narrow snouts, few teeth, and large salivary glands, yet they do not share a common ancestor. This is an example of which of the following?

- A genetic drift
- B founder effect
- C adaptive radiation
- ✓ D convergent evolution

7 In 1859, twenty-four European rabbits were brought to Australia for sport hunting. The rabbits had no natural predators, resulting in an exponential growth pattern for the rabbits. They ate crops and became a serious, destructive pest within a relatively short period of time. In an attempt to control the rabbit population, the *myxoma* virus was introduced into the rabbit population in 1950. Initially, the virus was highly effective, reducing the rabbit population by 99%. Currently, the *myxoma* mortality rate is less than 50%.

A. Describe one scientifically probable change in the rabbit population of Australia that resulted in the reduced effectiveness of the *myxoma* virus in controlling the number of wild rabbits.

B. Describe one scientifically probable change in the *myxoma* virus that resulted in the reduced effectiveness of the virus in controlling the number of wild rabbits.

Key Elements:

A. Any one of the following probable changes in the rabbit population:

- Some rabbits had a genetic immunity.
- Some rabbits had a genetic mutation that made them immune to the virus.
- Natural selection selected for the rabbits that were able to survive the virus and then pass that immunity to their offspring.
- Any other plausible reason for the change in the immunity of the rabbit population.

Rubric:

2 points Two key elements

1 point One key element

0 points Other

NOTE: Do not award key element for the term *Natural Selection* if there is no accompanying explanation.

AND

B. Any one probable change in the *myxoma* virus:

- Only the less deadly strains of the virus were able to survive and reproduce within the rabbit population.
- The virus mutated to a less deadly strain.
- Natural selection selected for only the less deadly strains of the virus.
- Any other plausible reason for the change in the *myxoma* virus.

8 List TWO significant contributions made by Gregor Mendel to the field of biology.

Key Elements:

- An inherited characteristic (trait) is determined by the combination of a pair of hereditary factors (genes).
- For each trait, offspring receive one version of the gene (allele) from each of the parents' reproductive cells.
- Different offspring of the same parents receive different sets of alleles.
- During fertilization, gametes randomly pair to produce four combinations of alleles.
- Inherited traits are dominant or recessive.
- Hybrids do not breed true.
- Many traits are inherited in pairs.
- The law of independent assortment (the emergence of one trait will not affect the emergence of another)
- The law of segregation
- Keeping meticulous records
- The study of only one trait at a time
- Any other significant contribution

Rubric:

- 2 points** Two key elements
- 1 point** One key element
- 0 points** Other

Reporting Category 5: Ecology

9 Which of the following desert organisms is a producer?

- A fox
- B lizard
- ✓ C cactus
- D scorpion

10 What is the maximum percentage of food energy available to a wolf that consumes a herbivorous field mouse?

- A 0.1%
- ✓ B 1%
- C 10%
- D 100%